ABSTRACT OF THE DISCLOSURE

System and method are described for register optimization during code translation utilizes a technique that removes the time overhead for analyzing register usage and eliminates fixed restraints on the compiler register usage. The present invention for register optimization utilizes a compiler to produce a register usage bit vector in a NOP instruction within each basic block (*i.e.*, subroutine, function, and/or procedure). Each bit in the bit vector represents a particular caller-saved register. A bit is set if, at the location of NOP instruction, the compiler uses the corresponding register within that basic block containing the NOP instruction to hold information to be used at a later time. During the translation, the translator examines the register usage bit vector to very quickly determine which registers are free and therefore can be used during the register optimization without the need to save and restore the register values.